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Interfacial structure of upward gas-liquid annular flow in an inclined pipe ADAM FERSHTMAN[1], Tel-Aviv University, LULKAS ROBERS, HORST-MICHAEL PRASSER, ETH Zurich, DVORA BARNEA, LEV SHEMER, Tel-Aviv University — In this study, the instantaneous circumferential distribution of the liquid film thickness is examined in upward annular flow of various pipe inclinations. The temporal variation of the film thickness was measured simultaneously across the entire pipe circumference using a multi-range conductance sensor covering about 7 cm in the axial direction. The recording of the temporal and spatial distribution of the film thickness allows investigation of characteristic interfacial wave parameters such as mean film thickness, frequency, wave height distribution, wave propagation velocities, wave length, and more. The interfacial waves observed across the pipe periphery vary with pipe inclination angle, liquid flow rate and circumference position. These waves were categorized as ripples, disturbance waves or rogue waves, based on parameters as frequency, wave height and exceedance. The distribution and the total mass transported by the shear driven waves is also examined. For a low liquid flow rate, a transition from stratified wavy to annular flow was documented with increase in pipe inclination. This data is crucial for better understanding and modeling of evolution of annular and stratified flow regimes as a function of gas and liquid flow rates and pipe inclination.

[1]APS Membership Pending

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